

CLAIMS

We claim:

1. A binder system comprising a phenolic resole resin component and an isocyanate component, wherein the phenolic resin component comprises (a) an alkoxy-modified phenolic resole resin and (b) an oxygen-rich polar, organic solvent.
5
2. The binder system of claim 2 wherein the oxygen-rich polar, organic solvent is selected from the group consisting of glycol ether esters, glycol diesters, glycol diethers, cyclic ketones, cyclic esters, cyclic carbonate, and mixtures thereof.
10
3. The binder system of claim 1 wherein the solvent portion of the phenolic resin component amounts to no more than 40 % by weight based upon the weight of the phenolic resin component and the amount of oxygen-rich polar solvent is at least 50 weight percent based on the total weight of the solvent in the phenolic resin component.
15
4. The binder system of claim 3 wherein the phenolic resole resin component which also contains a fatty acid ester derived from an alcohol having from 1 to 12 carbon atoms.
20
5. The binder system of claim 3 wherein the fatty acid ester is derived from an alcohol having from 4 to 12 carbon atoms.
- 25 6. The binder system of claim 5 wherein the fatty acid ester is the butyl ester of tall oil fatty acids.
7. The binder system of claim 6 wherein the phenolic resole resin is such that less than 25 mole % of the phenolic hydroxyl groups of the phenolic resole resin are etherified by a primary or secondary aliphatic monoalcohol.
30

8. A foundry mix comprising a major amount of aggregate and an effectively binding amount of a binder system according to claims 1, 2, 3, 4, 5, 6, or 7.
9. The foundry mix of claim 7 that further comprises a liquid curing catalyst.
5
10. A process for preparing a foundry shape by the cold-box process which comprises:
 - (a) forming a foundry mix as set forth in claim 8;
 - (b) forming a foundry shape by introducing the foundry mix obtained from step (a) into a pattern;
10
 - (c) contacting the shaped foundry mix with a volatile tertiary amine catalyst; and
15
 - (d) removing the foundry shape of step (c) from the pattern.
11. The process of claim 9 wherein the amount of said binder in said foundry mix is about 0.6 percent to about 5.0 percent based upon the weight of the aggregate.
20
12. A process of casting a metal which comprises:
 - (a) preparing a foundry shape in accordance with claim 9;
 - (b) pouring said metal while in the liquid state into and a round said shape;
25
 - (c) allowing said metal to cool and solidify; and
 - (d) then separating the molded article.
- 30
13. A process for preparing a foundry shape by the no-bake process which comprises:

- (a) forming a foundry mix as set forth in claim 8;
- 5 (b) forming a foundry shape by introducing the foundry mix obtained from step (a) into a pattern;
- (c) contacting the shaped foundry mix with a liquid tertiary amine catalyst; and
- (d) removing the foundry shape of step (c) from the pattern.

10

14. The process of claim 12 wherein the amount of said binder in said foundry mix is about 0.6 percent to about 5.0 percent based upon the weight of the aggregate.

15. The process of casting a metal which comprises:

15

- (a) preparing a foundry shape in accordance with claim 13;
- (b) pouring said metal while in the liquid state into and a round said shape;
- 20 (c) allowing said metal to cool and solidify; and
- (d) then separating the molded article.

25

30

35